Laboratory Equipment

Use of equipment
Please note that the name may not match exactly to your worksheet, therefore, match the picture from your worksheet to this power point.
Safety goggles

- Used to protect your eyes when heating anything or mixing chemicals.
- Protects eyes from broken glass, chemicals, and flames.
Safety shower

- Used for chemical or acid spills or in case of fire.
- Eye wash station used when chemical get into eyes.
Beaker/Beaker tongs

- Most versatile glassware-heating chemicals on hotplate, mixing substances, etc.
- Volume graduations should be used only for "ballpark" estimates.
Crucibles/Crucible tongs

- Used to hold small amounts of chemicals during heating at high temperatures, especially if you want to keep oxygen out of the reaction (just put on the cover).

- Used for picking up crucibles and crucible covers *only*. 
Stirring Rod

- stirs liquids in flasks or beakers
Dessicators

- Provide a dry environment for a crucible or a given substance to cool down, since moisture can affect mass results.
  - Common dessicant-anhydrous calcium chloride.

- Colored indicator crystals are usually included to tell condition of dessicant.
  - Gray color in crystals-dessicant is dry and will absorb moisture.
  - Pink color-dessicant is "hydrated".
    - When this happens, the water can be removed by heating it in an oven.
Dropping bottle

- Store and disperse a variety of liquids.
Drying oven

- Used to dry materials faster.
Erlenmeyer flask

- Shape constructed to facilitate swirling or mixing of reactants.
- NOT precise-250 mL flask typically holds 270 mL or so.
- Use only for approximate measurements.
Evaporating dish

- Used to recover dissolved solids by evaporation.
- While it can be heated, it should not be used for "strong" heating.
Florence flask

- Rounded bottom makes it ideal for boiling liquids.
- It also makes this flask easy to tip over when sitting on the lab table.
Forceps

- Used to grasp/hold small items.
- Often used for dissection.
- Not called tweezers.
Fume Hood:

- Safety glass-front cabinet w/exhaust fan.
- It is used for experiments known to produce noxious fumes or smoke.
Do the following to perform an experiment in the hood:

– Raise the door of the hood
– Turn on the light and set up the apparatus
– When all material for the experiment is ready, turn on the fan
– Pull the hood door at least 1/3 way down
– Perform the experiment
– When finished, pull the door all the way down until all smoke and fumes are removed
– Turn off the fan and light, then remove the equipment to a regular lab station for cleaning
– Leave the hood clean
Long stem funnel (filter funnel)

- When lined with filter paper, used to filter suspended solids from a liquid.
- Aides in pouring liquids into small openings.
Glass stirring rod w/rubber policeman

- Tool to mix reactants.
- Pour liquid down along it to keep it from splashing out.
- Movement of the rod additionally helps to spread the heat evenly.
- Rubber policeman keeps glass rod from scratching glass beaker or other container.
Graduate cylinders

- Make accurate measurements of liquid volumes.
- Bumper ring on larger cylinders is to prevent breakage if tipped over. Keep it near the top.
Graduated pipets

- Can have bulb or pipet pump.
- Convenient way to accurately transfer a small volume of liquid.
  - Volumetric pipet-used to measure one amount only.
  - Graduated pipet-lot of lines so you can measure many different amounts.
- Before making an accurate transfer, the user should pump the desired liquid into the pipet, roll the pipet horizontally to coat the entire interior surface with the liquid, and then allow the liquid to drain through the tip.
Micro flame burner

- Fueled by butane.
- Gives pure hot flame without smoke.
- Reach temperature you need faster.
Micro spatula

- Used to transfer solids.
Microscope slide/cover glass

- Microscope slide with or without well.
- Cover slip or cover glass-flattens liquids for better high power viewing, protects lens from liquids.
Mortar and pestle

- Used to grind solids into powders.
Spot plate

- Has number of small wells.
- Chemicals are placed in the small wells, and the reaction can be observed as it takes place in the well.
Support ring

- Attaches to the ring stand and is used to support glassware above the lab table.
Test tube/Test tube rack/Test tube holder

- Test tube-used as container to hold chemicals during heating or other reactions.
- Test tube rack-supports test tubes, hang tubes upside down for drying.
- Test tube holder-used in cases of heating.
Tongs

Used to hold or pick up many items, but work best as tongs for picking up hot evaporating dish.
Transfer pipet

- Used to transfer very small amounts of liquids.
Tripod

- Can be placed over Bunsen burner, alcohol lamp, or micro flame burner.
- Use with wire gauge or clay tripod.
Utility clamp

When attached to the ring stand, this clamp is used to hold a large test tube or Florence flask above the lab table.
Volumetric flasks

- Used to prepare solutions of exact concentrations of solutions.
- It has a precise graduation line in the neck of the flask.
- Never heat substances in them.
- First rinse inside with solvent, then transfer a small amount of solvent followed by the required amount of solute, and swirl.
- Further fill the flask with solvent to just below the mark etched in the glass.
- Last few drops added with a medicine dropper or Pasteur pipet for accuracy.
- Finally, w/stopper and base supported, invert flask about ten times to ensure homogeneity in the mixing.
Watch glass

- Used like evaporating dish for drying very small amounts of material.
- Used to cover beakers.
- Used for weighing small amounts of material.
Weighing paper

- Used with a balance so that chemicals are placed on the paper, instead of directly on the balance.
Wash bottles

- In the general chemistry lab, are usually filled with distilled or deionized water.
- Used for rinsing solids out of a container when filtering.
- Used to rinse glassware.
Wire gauze/Clay triangle

- Used as a support for containers when placed across a support ring above a burner.
- Wire gauze spreads out flame/heat evenly over container.
- Clay triangle can hold a funnel during filtering.
Measuring the volume of a liquid with a graduated cylinder:

- Surface of liquid in cylinder curves to form a **meniscus**.
- Meniscus of most liquids curves up sides of container (center lower than edges).
  - Mercury is one of very few exceptions - it curves down at the edges.
- Always read bottom of curve.
Using the smallest graduation, estimate between the two lines where the meniscus falls.

As the diameter of the cylinder increases, the curve of the meniscus flattens out.

Putting card/paper behind meniscus makes it easier to read.
Measuring the volume of a liquid with a pipet:

- Pipets are much more accurate than graduated cylinders.
- Liquid must be drawn into the pipet.
- **Gradually** release the pressure of your squeeze on the bulb and allow the liquid to be drawn into the pipet.
  - Draw more liquid than needed, but **do not** allow the liquid to enter the bulb.
Measuring mass with an electronic balance:

Never place a chemical directly on balance pan-use container.

Place container on balance-its mass is displayed.

Press Zero button-balance resets to zero and ignores mass of container.

Place substance to be weighed into container-balance will show only the mass of substance.

When container is removed, press Zero button again.
Measuring mass with a triple-beam balance:

- Place object on balance pan.
- Move tares on beams to balance mass.
- Back beam graduated in 10 gram steps/middle beam graduated in 100 gram steps.
  - Tares on these two beams are in the notch for the whole number of grams and not in between notches.
- The front beam is a sliding scale graduated in grams.
- The tare on this beam can be positioned anywhere on the scale.
- Masses on a triple-beam balance can be read to tenths of a gram, and estimated to hundredths.
Filtering a precipitate from a solution:

- Filtering a solid out of a liquid is done using **filter paper** and a **filter funnel**.
- The filter funnel is supported by the ring on a ring stand.
- Lay a clay triangle across the ring, then place the filter funnel into the triangle.
- To prepare the filter paper, fold the paper in half, then fold it in half again.
Catch three of the four edges of paper at open edge.
– Squeeze sides of folded paper and cone will form w/3 thicknesses of paper on one side and one thickness of paper on the other.
– Place this cone of paper into the filter funnel.

Place catch dish under funnel.

Wet down inside of filter paper with wash bottle—it sticks to funnel.

Carefully pour liquid to be filtered into mouth of funnel.
– **Do not** let the liquid rise to the top of the filter paper.
– If **any liquid** goes over and around the paper, your procedure is ruined.
– Be patient, it will take time for the liquid to move through the pores of the paper.

When all original liquid has been poured into the funnel, use wash bottle to rinse any remaining precipitate out of the original container.

Do not touch or try to stir the liquid inside the filter paper.
– The wet paper is easily torn, which will ruin your procedure.